

Appl. No. 10/608,176
Amdt. Dated June 19, 2006
Reply to Office Action of March 17, 2006

AMENDMENTS TO THE DRAWINGS

The attached three sheets of drawings include changes to FIGS. 2, 3 and 5. In FIG. 2, previously omitted reference number 216 has been added. In FIGS. 3 and 5, previously omitted cross hatching has been added.

Attachment: 3 replacement sheets

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REMARKS

This is a full and timely response to the non-final Office action mailed March 17, 2006. Reexamination and reconsideration in view of the foregoing amendments and following remarks is respectfully solicited.

Claims 1-24 are pending in this application, with claims 1 and 17 being the independent claims. Claim 4 has been amended, and claims 25-26 have been withdrawn. No new matter is believed to have been added.

Objections to the Drawings

In the office action, the Examiner objected to the drawings as not showing the proper hatchings in FIGS. 3 and 5. Applicants have attached replacement sheets that add additional cross hatching to these FIGS. Applicants thus submit that this objection has thus been overcome.

The Examiner also objected to the failure of the drawings to show lubricant designated with an appropriate referential numeral. In response applicants have amended FIG. 3 to show grease 7 in the bearing 300. Applicants thus submit that this rejection has thus been overcome.

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Objections to the Disclosure

The Examiner has objected to the disclosure for failure to designate the lubricant with a reference numeral. Accordingly, applicants have amended paragraph 0049 to reference a grease 7 as an example of a lubricant, which corresponds to the amendment to FIG. 3 discussed above. Applicants thus submit that this rejection has been overcome.

Objections to the Claims

The Examiner has objected to claim 4 for informalities. Specifically, the Examiner objected to the phrase "a change in thickness" and suggested an amendment to "a change in the thickness". Applicants have amended claim 4 as suggested, and thus submit that this rejection has been overcome.

Rejections under 35 U.S.C. § 112

Claims 12, 13 and 22 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner stated that the claims contain subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention. Specifically, the Examiner stated that claims 12, 13 and 22 recite selective control of the control voltage to distribute lubrication in the bearing, but then stated that the drawings do not show the lubrication, the lubrication reservoir, lubrication conduits, etc., and how lubricant is distributed in the bearing. The Examiner further alleged that it was unclear as to how the control system controls the voltage to distribute the lubrication in the bearings as claimed.

Applicants respectfully disagree, and submit that claims 12, 13 and 22 meet the written description requirement of 35 U.S.C. § 112, first paragraph. First, applicants note that the claims 12, 13 and 22 were filed with the original disclosure. Second,

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applicants submit that the specification adequately describes how the recited preload adjustment device could be used to distribute lubrication in the bearing. For example, paragraphs 0049-0051 describe how the bearings can be filled with a lubricant such as grease, and how by applying a high frequency control signal, the preload spacer will provide a high frequency vibration that will assist in redistributing lubrication in the bearings. Thus, the system is able to facilitate redistribution of lubrication without requiring any specific configuration of lubrication reservoir and/or conduits. As such, no detailed description or illustration of a lubrication reservoir and/or conduits is required. Applicants thus submit claims 12, 13 and 22 meet the written description requirement. Applicants thus request that the rejections under 35 U.S.C. § 112, first paragraph, be withdrawn.

Rejections under 35 U.S.C. § 102

Claims 1-5, 7, 8, 17-21, 23 and 24 were rejected under 35 U.S.C. § 102(b) as being anticipated by Perni et al (E.P. Patent No. 1,134,443), hereinafter "Perni"). Regarding claim 1, the Examiner stated that Perni teaches a piezodynamic preload spacer 22 coupled to a bearing 10, in a momentum control device 2, the preload spacer 22 configured such that an application of a control voltage to the piezodynamic preload spacer 22 causes a change in dimension of the spacer 22, and wherein a change in the dimension of the spacer 22 changes a preload of the bearing 10. The Examiner further stated that Perni disclosed a control system, the control system providing selective control of a control voltage to selectively control the preload on the bearing 10.

Applicants respectfully disagree, and submit that independent claim 1 is patentably distinct over the cited Perni reference for several reasons. First, claim 1 recites that the piezodynamic preload spacer is coupled to a bearing in a "momentum control device". Applicants submit that Perni fails to teach a momentum control device. The Examiner

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cites element 2 of FIG. 1 of Perni as being such a momentum control device. Applicants disagree, and note that element 2 of Perni is described as an actuator device. In contrast, momentum control devices, as described in applicants' specification, are used to provide a torque for attitude control to spacecraft and other vehicles. See applicants' specification at paragraph 0002. Two types of momentum control device are reaction wheels and control moment gyroscopes. See paragraphs 0003 and 0004, and claims 7, 8. As Perni fails to teach the use of a piezodynamic preload spacer in a momentum control device, as the term is used and defined in the specification, it fails to anticipate the claimed invention.

Thus, applicants submit that independent claim 1 is patentably distinct over the cited Perni reference. Furthermore, as claims 2-16 depend from, and include all the limitations of independent claim 1, they are also submitted to be patentably distinct. Furthermore, independent claim 17 and dependent claims 18-24 are submitted to be patentably distinct for the same reasons.

Claims 1 and 9-16 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kudo et al (U.S. Patent No. 6,286,374), hereinafter "Kudo"). Again, applicants respectfully disagree, and submit that independent claims 1 and 17 are patentably distinct over the cited Kudo reference. First, claim 1 recites the piezodynamic preload spacer is coupled to a bearing in a "momentum control device". Applicants submit that Kudo fails to teach a momentum control device. The Examiner cites element 100 of Kudo as being such a momentum control device. Applicants disagree, and note that element 100 of Kudo is described as a preload measuring apparatus. In contrast, momentum control devices, as described in applicants' specification, are used to provide a torque for attitude control to spacecraft and other vehicles. As Kudo fails to teach the use of a piezodynamic

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preload spacer in a momentum control device, it fails to anticipate the claimed invention recited in independent claims 1 and 17.

Thus, applicants submit that independent claims 1 and 17 are patentably distinct over the cited Kudo reference. Furthermore, as claims 2-16 and 18-24 depend from, and include all the limitations of their respective independent claims, they are also submitted to be patentably distinct.

Claims 1-5, 7-11, 14-21, 23 and 24 were rejected under 35 U.S.C. § 102(e) as being anticipated by Fleury et al (U.S. Patent No. 6,505,968), hereinafter "Fleury"). The Examiner stated that Fleury teaches a preload adjustment device that comprises a piezodynamic preload spacer coupled to a bearing in a momentum control device (citing elements 200, 400, 800, 900 and 1000). Applicants again disagree, and submit that the claims are patentably distinguished over the cited references. Specifically, applicants submit that Fleury fails to teach a momentum control device. The Examiner cites elements 200, 400, 800, 900 and 1000 of Fleury as being such a momentum control device. Applicants disagree, and note that each of these elements are described as bearing assemblies for use in the spindle motor of a disc drive. See column 5, lines 1-5 of Fleury. As Fleury fails to teach the use of a piezodynamic preload spacer in a momentum control device, it fails to anticipate the claimed invention recited in independent claims 1 and 17.

Thus, applicants submit that independent claims 1 and 17 are patentably distinct over the cited Fleury reference. Furthermore, as claims 2-16 and 18-24 depend from, and include all the limitations of their respective independent claims, they are also submitted to be patentably distinct.

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Claims 12, 13 and 22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fleury in view of Karamata (U.S. Patent No. 6,505,968), hereinafter "Karamata"). The Examiner admitted that Fleury fails to teach the use control system to distribute lubrication in the bearing, but stated that Karamata teaches such a system. Applicants respectfully disagree. Specifically, while Karamata describes a lubrication system, it does not describe a control system adapted for use with piezodynamic preload spacer, such that the control system provides a control voltage to the piezodynamic preload spacer to distribute lubrication in the bearings. Applicants note that these claims recite a system where the same piezodynamic spacer is used to provide both bearing preload and distribute lubrication. Neither reference discloses such a device. Instead, Karamata describes a typical lubrication system that uses a spring and piston to distribute lubrication. See the abstract of Katama. Thus, neither reference teaches the use of a control system adapted to provide a control voltage to a piezodynamic preload spacer to distribute lubrication in bearings. Thus, applicants submit that claims 12, 13 and 22 are patentably distinct over the cited combination of references.

Claims 1 and 17 were rejected under 35 U.S.C. § 102(e) as being anticipated by Wu et al (U.S. Patent No. 6,522,757), hereinafter "Wu"). Again, applicants respectfully disagree. Again, claim 1 and claim 17 both recite piezodynamic preload spacer is coupled to a bearing in a "momentum control device". Applicants submit that Wu fails to teach a momentum control device. As Wu fails to teach the use of a piezodynamic preload spacer in a momentum control device, it fails to anticipate the claimed invention recited in independent claims 1 and 17.

Claims 1 and 17 were rejected under 35 U.S.C. § 102(e) as being anticipated by Moseley et al (U.S. Patent No. 4,850,719), hereinafter "Moseley"). Again, applicants respectfully disagree. Again, claim 1 and claim 17 both recite piezodynamic preload

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spacer is coupled to a bearing in a "momentum control device". Applicants submit that Moseley fails to teach a momentum control device. As Mosely fails to teach the use of a piezodynamic preload spacer in a momentum control device, it fails to anticipate the claimed invention recited in independent claims 1 and 17.

Claim 1 was rejected under 35 U.S.C. § 102(e) as being anticipated by Golz et al (EP. Patent No. 0 377 145), hereinafter "Golz"). The Examiner offered no details of this rejection. For example, the Examiner failed to specify where Golz teaches the use of a piezodynamic preload spacer in a momentum control device. Applicants thus submit that the Examiner has failed to make a prima facie case of obviousness. Applicants note that the abstract of Golz fails to teach fails to teach a momentum control device.

Applicants thus submit that independent claims 1 and 17 are patentably distinct over the cited references. Furthermore, in addition to the dependent claims discussed above, the other dependent claims include many other features not found in the cited references. For example, they do not disclose where the momentum control device comprises a reaction wheel as recited in claim 7. Nor do they disclose where the momentum control device comprises a control moment gyroscope as recited in claim 8.

With regard to claims 9, 10, 11, 14, 15, 16, 19, 20, 22, 23, and 24 the cited references do not disclose the selective use of a control voltage to compensate for changes in operating environment of a momentum control device, for wear in the bearing of a momentum control device, to compensate for thermal expansion in the bearing of a momentum control device, or to adjust the preload during the launch of a momentum control device.

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In summary, none of the references cited by the Examiner nor any other known prior art, either alone or in combination, disclose the unique combination of features disclosed in applicant's claims presently on file. For this reason, allowance of all of applicant's claims is respectfully solicited.

In the office action, the Examiner provisionally rejected claims 1-5, 7, 8, 17 and 18 as being unpatentable over copending Application No. 10/608,174. Although the Examiner noted that the claims were not identical, the Examiner stated they were not patentably distinct. In supporting this rejection, the Examiner stated that absorbing vibration inherently controls the preload. Applicants strenuously disagree, and note that "tuning system" of the '174 claims is implemented to provide selective control of a resonant frequency of the vibration damping device such that the vibration damping device absorbs vibrations in a selected frequency range. In contrast, the present claims describe a control system that provides selective control of the preload on the bearings, with no mention of vibration. Applicants submit that such a completely different purpose and implementation are patentably distinct. Furthermore, applicants note that the Examiner has provided no evidence to support the statement that absorbing vibration inherently controls the preload.

Conclusion

Based on the above, independent claims 1 and 17 are patentable over the citations of record. The dependent claims are also deemed patentable for the reasons given above with respect to the independent claims and because each recite features which are patentable in its own right. Individual consideration of the dependent claims is respectfully solicited.

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The other art of record is also not understood to disclose or suggest the inventive concept of the present invention as defined by the claims. Hence, applicants submit that the present application is in condition for allowance. Favorable reconsideration and withdrawal of the objections and rejections set forth in the above-noted Office action, and an early Notice of Allowance are requested.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

If for some reason Applicants have not paid a sufficient fee for this response, please consider this as authorization to charge Ingrassia, Fisher & Lorenz, Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

INGRASSIA FISHER & LORENZ

Dated: 19 June 2006

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